AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A fluid heat exchanger for use in a fluid heating system comprising:

a rapidly heatable inside tube including a hot portion for generation heat in combination with an unheated cold portion for providing power to said hot portion; said hot portion being continuous through said rapidly heatable inside tube and having opposing ends connected to said cold portion, said rapidly heatable inside tube having at lest one portion ~~having~~ with and axial curvature along the length of said hot portion;

a hollow outside tube surrounding said cold portion and said hot portion of said rapidly heatable inside tube;

a fluid passing between said rapidly heatable inside tube and said outside tube for circulation through said fluid heating system;

wherein said rapidly heatable inside tube is rapidly heated by said hot portion so that said rapidly heatable inside tube is heated throughout its continuous length and said fluid is rapidly heated as it passes over said hot portion to a predetermined temperature for use in said fluid heating system.

2. (Original) The fluid heat exchanger according to claim 1 wherein said outside tube is thin-walled.

3. (Previously Presented) The fluid heat exchanger according to claim 1 wherein said rapidly heatable inside and outside tube have respective circular cross sections.

4. (Previously Presented) The fluid heat exchanger according to claim 1 wherein said outside tube concentrically surrounds said rapidly heatable inside tube.

5. (Original) The fluid heat exchanger according to claim 1 further comprising an insulating layer surrounding said outside tube.

6. (Currently Amended) The fluid heat exchanger according to claim 1 wherein ~~said inside tube further comprises a rapidly heatable hot portion extending longitudinally within said inside tube~~ said cold portion has an opposing proximal end and distal end, said distal end of said cold portion extending outwardly from said rapidly heatable inside tube, said hot portion being interposed between said cold portion for connection with respective said proximal ends of said cold portion within said rapidly heatable inside tube; wherein said cold portion receives electrical power from an electrical power source for rapidly heating said rapidly heatable inside tube.

7. (Previously Presented) The fluid heat exchanger according to claim 1 wherein said outside tube defines an inside surface and said rapidly heatable inside tube defines an outside surface, said inside and outside surface being electropolished.

8. (Original) The fluid heat exchanger according to claim 1 wherein said fluid may be raised to a supercritical condition by said rapidly heatable inside tube.

9. (Original) The fluid heat exchanger according to claim 1 wherein said fluid heat exchanger is of compact construction.

10. (Previously Presented) The fluid heat exchanger according to claim 1 further comprising a temperature control system having at least one sensor located along said fluid heat exchanger in sensing communication with said fluid, said temperature control system controlling the operation of said heatable inside tube by regulating said fluid temperature within a predetermined range based on fluid temperature readings taken by said temperature control system; wherein said inside tube is rapidly heated by said temperature control system; wherein said rapidly heatable inside tube is rapidly heated by said temperature control system such that said fluid is rapidly heated to within said predetermined range for use in said fluid heating system.

11. (Original) The fluid heat exchanger according to claim 4 further comprising at least one coiled wire interposed between said inside tube and said outside tube for maintaining concentricity between said inside and outside tubes.

12. (Original) The fluid heat exchanger according to claim 4 wherein said inside tube defines an outside surface having longitudinally spaced raised regions extending outwardly therefrom such that concentricity is maintained between said inside and outside tubes.

13. (Previously Presented) The fluid heat exchanger according to claim 6 wherein said hot portion coils longitudinally within said rapidly heatable inside tube.

14. (Original) The fluid heat exchanger according to claim 8 wherein said fluid comprises carbon dioxide.

15. (Original) The fluid heat exchanger according to claim 12 wherein said raised regions proceed helically along said outside tube.

16. (Original) The fluid heat exchanger according to claim 12 wherein said outside tube defines an inside surface, said inside surface having longitudinally spaced raised regions extending inwardly therefrom to maintain concentricity between said inside and outside tubes.

17. (cancelled)

18. (Original) The fluid heat exchanger according to claim 16 wherein said raised regions proceed helically along said outside tube.

19. (Currently Amended) A fluid heating system comprising:

a fluid heat exchanger defining a rapidly heatable inside tube including a hot portion for generating heat in combination with an unheated cold portion for providing power to said hot portion, said hot portion being continuous through said rapidly heatable inside tube having at least one portion with an axial curvature along the length of said hot portion;

a hollow inside tube surrounding said cold portion and said hot portion of said rapidly heatable inside tube;

a fluid passing between said inside tube and said outside tube for circulation through said fluid heating system;

a temperature control system having at least one sensor located along said fluid heat exchanger in sensing communication with said fluid, said temperature control system controlling the operation of said heatable inside tube by regulating said fluid temperature within a predetermined range based on fluid temperature readings taken by said temperature control system;

wherein said inside tube is rapidly heated by said hot portion and controlled by said temperature control system such that said fluid is rapidly heated to within said predetermined range as it passes over said hot portion for use in said fluid heating system.

20. (Original) The fluid heating system according to claim 19 wherein said at least one sensor is positioned in the fluid flow stream.

21. (Previously Presented) The fluid heating system according to claim 19 wherein said at least one sensor is located within said outside tube.

22. (Original) The fluid heating system according to claim 19 wherein said temperature control system further comprises a microprocessor-based controller.

23. (Previously Presented) The fluid heating system according to claim 19 wherein said at least one sensor may be located in the fluid flow stream and within said outside tube.

24. (Original) The fluid heating system according to claim 19 wherein said at least one sensor comprises a thermistor.

25. (Original) The fluid heating system according to claim 19 wherein said at least one sensor comprises a resistance temperature detector.

26. (Original) The fluid heating system according to claim 19 wherein said at least one sensor comprises a thermocouple.

27. (Original) The fluid heating system according to claim 19 wherein said fluid heating system raises the temperature level of said fluid in a substantially linear trend per unit of time.

28. (Original) The fluid heating system according to claim 20 wherein said at least one sensor is located in a raised region formed along said outside tube.

29. (Currently Amended) A fluid heat exchanger for use in a fluid heating system comprising:

a rapidly heatable inside tube including a hot portion for generating heat in combination with an unheated cold portion for providing power to said hot portion, said hot portion being continuous through said rapidly heatable inside tube and having opposing ends connected to said cold portion, said rapidly heatable inside tube having at least one portion ~~having~~ with and axial curvature along the length of said hot portion;

a hollow outside tube closely surrounding said cold portion and said hot portion of said rapidly heatable inside tube, said inside and outside tubes collectively formable in a number of shapes;

said rapidly heatable inside tube and said outside tube defining a passageway for a fluid passing therebetween for circulation through said fluid heating system;

wherein said rapidly heatable inside tube is rapidly heated by said hot portion so that said rapidly heatable inside tube is heated throughout its continuous length for heating said fluid to a predetermined temperature as said fluid passes over said hot portion for use in said fluid heating system.

30. (Original) The fluid heating system according to claim 29 wherein said passageway defines a small cross-sectional area for said fluid to pass therethrough.

31. (Original) The fluid heating system according to claim 29 wherein said shapes collectively formable with said inside and outside tubes define a compact construction.

32. (Original) The fluid heating system according to claim 30 wherein said passageway defines an annular cross-sectional area.

33. (Original) The fluid heating system according to claim 30 wherein the convective film coefficient along the outer periphery of said rapidly heatable inside tube is a large value.

34. (Currently Amended) A fluid heat exchanger for use in a fluid heating system comprising:

a rapidly heatable inside tube having an outer peripheral surface including a hot portion for generating heat in combination with an unheated cold portion for providing power to said hot portion, said hot portion being continuous through said rapidly heatable inside tube and having opposing ends connected to said cold portion, said rapidly heatable inside tube having at least one portion ~~having~~ with and axial curvature along the length of said hot portion;

a hollow outside tube closely surrounding said cold portion and said hot portion of said rapidly heatable inside tube substantially concentrically, said inside and outside tubes collectively formable in a number of shapes;

said rapidly heatable inside tube and said outside tube defining a passageway having a small cross-sectional area therebetween;

a fluid passing along said passageway for circulation through said fluid heating system that is heated as it passes over said hot portion;

a temperature control system having at least one sensor located along said fluid heat exchanger in sensing communication with said fluid, said temperature control system controlling the operation of said rapidly heatable inside tube by regulating said fluid temperature within a predetermined range based on fluid temperature readings taken by said temperature control system;

wherein said outer peripheral surface of said rapidly heatable inside tube having a high convective film coefficient value is rapidly heated by said hot portion so that said rapidly heatable inside tube is heated throughout its continuous length by said temperature control system such that said fluid is rapidly heated to within said predetermined range for use in said fluid heating system.